

REMARKS

Entry of the above amendments is respectfully requested. Claims 1-11 were pending at the time of this Office Action. Claim 1 is amended, and claims 12-20 have been added.

Applicant respectfully requests reconsideration and allowance of pending claims 1-11 and new claims 12-20 in view of the following arguments.

1. **Rejection under 35 U.S.C § 102(b)**

The examiner rejected claims 1-11 under 35 U.S.C § 102(e) as being anticipated by U.S. Pat. No. 6,477,289 (hereafter *Li*). Applicant respectfully traverses the rejections in view of the amendments and the foregoing arguments.

a. **System of Preferred Embodiment**

One embodiment of the invention, as defined in the amended claims, is a filter module for an optical communications system. The filter module includes a lens, three optical fibers, an optical filter, and a mirror. The three optical fibers are arranged on a single side of the lens. The filter module further includes a refraction index distribution type rod lens having a first end face in core alignment with the mirror and a second end face to receive a light beam. The filter module further includes an interference film disposed between the rod lens and the mirror to selectively reflect certain wavelengths of light.

A first of the three optical fibers is constructed to serve as a first signal port for an inputting/outputting an optical signal having a wavelength-multiplexed signal (e.g., $\lambda_1 + \lambda_2$). A second of the three optical fibers is constructed to serve as a second signal port for inputting/outputting an optical signal of wavelength λ_2 reflected by the interference film. A third of the three optical fibers is constructed to serve as third signal port for inputting/outputting an optical signal of the wavelength λ_1 passing through the interference film filter and reflected by the mirror through the refraction index. The configuration of the refraction index with the mirror and the interference film provides simplified operation at a low fabrication cost as described in further detail in the Specification at, for example, page 13, line 27 to page 14, line 30.

Another embodiment of the invention, as defined by the claims, provides a demultiplexing/multiplexing unit that includes a plurality of filter modules that are connected in a cascade. Each of the filter modules includes a lens, optical filter, a mirror, and three optical fibers arranged on a single side of the lens, similar in construction to the filter modules of the preferred embodiments described above. As FIG. 4 shows, for example, when a plurality of filter modules 1 are connected in cascade to form a multichannel demultiplexing/multiplexing unit 8, the optical fiber wiring for connecting the individual filter modules 1 becomes straightforward so that no large space is needed.

b. Patentability over Cited References

i. Claim 1

Claim 1 recites a “filter” module that generally includes a lens, an optical filter, a mirror, and three optical fibers that are arranged on a single side of said lens.

Li and the other cited references fail to teach a filter module that encompasses each and every element of claim 1. *Li* discloses an ADD/DROP “switch” with a first flashlight 104 and a second flashlight 106 disposed on opposite side of a refractive element 102 (col. 7, lines 21-24; Figs. 3A and 3B). The first flashlight includes an input fiber 12 and an ADD fiber 114 to receive input signals (col. 7, lines 24-29). A selected wavelength of an input signal is transmitted via an express fiber 116 to the second flashlight 106 without passing through a refractive element 102. The remainder of the input light beam is transmitted through the refractive element 102 to the second flashlight 106 (col. 7, lines 29-33). Disposed at the opposite side of the switch, the second flashlight 106 includes the express fiber 116, a DROP fiber 124, and an output fiber 126 configured to output the signals in a desired added or dropped manner, depending on the position of the switch (col. 7, lines 42-44).

The *Li* device does not disclose the filter module as recited in claim 1. Importantly, the *Li* device does not receive the input signal and output the filtered and unfiltered portions of the signal on the same side of the filter module. Rather, *Li* discloses a complex switch device configured for receiving a first and a second input signal at one flashlight 104 on one side of the switch, and transmitting the signals either

via the express bypass fiber 116 or through the refractive element 102 to a second flashlight 106 for output at the opposite side of the switch from the first flashlight 104. Accordingly, the two conventional core alignment/fixation processes are unnecessary; namely, the process in which an optical fiber and a rod lens are subjected to core alignment and fixation in order to fabricate a second FC and the process in which two FC's are subjected to core alignment and fixation in the tube, as described further in the Specification. Consequently, the fabrication time is further reduced, the fabrication cost can be reduced, the modularization becomes straightforward, and the product characteristics of a filter module are improved in reliability. Moreover, the *Li* switch device is more complex to operate and fabricate, and so does not read on the simplified "filter" module recited in claim 1. Therefore, *Li* does not teach each every limitation of the claimed invention. Accordingly, allowance of claim 1 is respectfully requested.

ii. Claims 2-6

Dependent claims 2-6 are believed to be in condition for allowance as incorporating by reference the limitations of claim 1, and moreover defining additional features of the invention, which, when considered in combination with those of claim 1, are not anticipated by the prior art relied upon in the rejection. For example, *Li* and the other cited references do not disclose a refractive index distribution type rod lens having a first end face coated with the optical filter, and a second end face arranged with three optical fibers as recited in claim 2. In another example, none of the cited references disclose a through hole that is formed by three inner walls, wherein the three optical fibers contact each other in said through hole, and each of the three inner walls contacts

two optical fibers as recited in claim 4. In yet another example, none of the cited references disclose a filter module that includes the limitations of claim 1, wherein the mirror is a “total” reflection mirror arranged to face the optical filter as recited in claim 5.

iii. Claim 7

Claim 7 recites a demultiplexing/multiplexing unit, which is a multichannel demultiplexing/multiplexing unit formed by connecting a cascade of filter modules, each filter module including an optical filter, a mirror, a lens, and three optical fibers arranged on a single side of the lens.

For reasons similar to those described above for claim 1, *Li* does not disclose a cascade of filter modules as recited in claim 7 that connect together to form a demultiplexing/multiplexing unit. Rather, *Li* discloses an ADD/DROP optical switch device. Moreover, the *Li* does not teach “a cascade” of filter modules as recited in claim 7. Thus, *Li* teaches away from interpreting the ADD/DROP optical device as a filter module. In view of the foregoing arguments, *Li* does not teach each and every limitation of claim 7. Accordingly allowance of claim 7 is respectfully requested.

iv. Claims 8-11

Dependent claims 8-11 are believed to be in condition for allowance as incorporating by reference the limitations of claim 7, and moreover defining additional features of the invention, which, when considered in combination with those of claim 7, are not anticipated by the prior art relied upon in the rejection. For example, *Li* and the other cited references do not disclose a refractive index distribution type rod lens having

a first end face coated with the optical filter, and a second end face arranged with three optical fibers as recited in claim 8. In another example, none of the cited references disclose a capillary with a through hole that is formed by three inner walls, wherein the three optical fibers contact each other in said through hole, and each of the three inner walls contacts two optical fibers as recited in claim 10. In yet another example, none of the cited references disclose a filter module that includes the limitations of claim 1, wherein the mirror is a “total” reflection mirror arranged to face the optical filter as recited in claim 11.

2. New claims 12-20

New claim 12 recites a filter module incorporating all of the limitations of claim 1, wherein the three optical fibers includes a first fiber, a second fiber, and a third fiber, the first fiber configured to carry a first signal characterized by a first wavelength and a second signal characterized by a second wavelength different from the first wavelength, the second fiber configured to output one of the first and second signals from the filter module, and the third fiber configured to carry the other of the first and second signals from the filter module. Claim 13 recites a filter module incorporating all of the limitations of claim 1, wherein all of the optical fibers of the filter module are arranged on a single side of said lens. None of the cited references teach or suggest these limitations. Allowance of claims 12 and 13 is respectfully requested.

New claim 14 recites a filter module that includes a lens, an optical filter, a mirror, and at least three optical fibers, where all of the optical fibers of the filter module are arranged on a single side of said lens. *Li* discloses optical fibers on both sides of a

lens. *Li* does not disclose all of the optical fibers on the same side of the lens. This configuration of the filter module provides simplified signal conditioning at a low fabrication cost. A review of the remaining cited references fails to teach or suggest the limitations of claim 14. Allowance of claim 14 is respectfully requested.

Dependent claims 15-20 are believed to be in condition for allowance as incorporating by reference the limitations of claim 14, and moreover defining additional features of the invention, which, when considered in combination with those of claim 14, are not taught or suggested in the cited references.

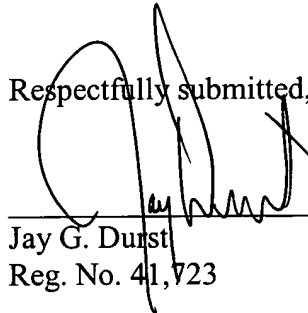
CONCLUSION

In view of the present amendments and above remarks, pending amended claims 1-11, as well as new claims 12-20, are believed to be novel and non-obvious over the cited art and an indication to that effect is respectfully requested.

Should the Examiner have any questions or wish to discuss the above for any reason, he is invited to contact the undersigned at the telephone number appearing below.

A check in the amount of \$110.00 is included with this communication to cover the fee for the one (1) month extension of time to reply to the Office Action. Should the Examiner consider any other fees to be payable in conjunction with this or any further communication, the Commissioner is authorized to direct payment of such fees or credit any overpayment, to Deposit Account 50-1170.

Respectfully submitted,



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